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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/891,682	Applicant(s) COLGAN ET AL.	
	Examiner Mike Qi	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-20 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-13 and 16 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 14 and 15 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9, recitation "... securing the liquid crystal cell; ..." is indefinite. Because the "securing" cannot tell how to secure the liquid crystal cell, in other words, it does not indicate the specific securing method and the securing can be various protections. According to the specification, such as Fig.2, using Jig (18) secures the device (10) (liquid crystal cell) during lapping and/or polishing.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 5,766,493 (Shin).

Claim 1, AAPA discloses (page 1, line 14 – page 9, line 5; Fig.1) that a method of fabricating a collimate and post diffuse type liquid crystal cell comprising:

- first substrate (TFT substrate) (9), second substrate (color filter substrate) (7), having same thickness, such as 0.7 mm;
- lapping the first substrate and concurrently lapping the second substrate;
- polishing the first and second substrates.

AAPA does not expressly disclose making the first substrate and the second substrate having different thickness by lapping the first substrate at a first rate and lapping the second substrate at a second rate, and the thinner substrate is on the viewer side of the liquid crystal cell.

However, Shin discloses (col.3, lines 30 – 41) that the upper and lower substrates can have different thickness. The thinner substrate would have good light transmittance, the thicker substrate would prevent cracks. Therefore, using thinner substrate on the viewer side of the liquid crystal cell would increase the light transmittance, and increasing the display brightness; and using thicker substrate on the support side of the liquid crystal cell would prevent the cracks during assembly process.

In order to make thinner for the first substrate and thicker for the second substrate, the lapping rate for the first substrate must be higher than the lapping rate for the second substrate. As the AAPA disclosed (page 2, lines 18 –24) that the bulk of the material is removed by lapping using rough abrasive compounds. Therefore, the material would be removed more in a faster lapping rate, and the material would be remove less in a slower lapping rate.

Providing a thinner substrate on a viewer side of the liquid crystal cell to reduce depixelization is a function limitation of using a thinner substrate on a viewer side of the liquid crystal cell and that does not given weight for the claim.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a first lapping rate for lapping the first substrate thinner and to use a second lapping rate for lapping the second substrate thicker so as to have different thickness for the first and the second substrates as claimed in claim 1, since the thinner substrate would increase the display brightness and the thick support substrate would prevent cracks during the assembly process.

5. Claims 9, 2-5, 8, 10-13, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 5,766,493 (Shin) and "Development of a Manufacturing Process for a Thin, Lightweight LCD Cell" (Ohkuma et al).

Claim 9, all the limitations are the same as the claim 1 except for the limitation of securing the liquid crystal, and the lapping by contacting a rotating plate with the substrate that is a conventional method to make the substrate thinner. Concerning the securing process, Ohkuma discloses (Fig.2) that the LCD cell can be secured by jigs, therefore, the LCD cell would be fixed there during the lapping and polishing process, and the lapping, polishing process is performed by contacting a rotating plate with the substrate of the LCD cell (see Fig.2).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use claming mechanism such as jigs or similar as claimed in

claim 9 for securing the position of the substrates fixed during the lapping and polishing process.

Claims 2-4 and 10-12, Shin discloses (col.3, lines 30 – 41) that the upper and lower substrates can have different thickness. The thinner substrate would have good light transmittance, the thicker substrate would prevent cracks.

Ohkuma discloses (Fig.2) that the LCD cell thinning by lapping and polishing, and using an abrasive material on a plate and rotating the plate to lap the substrates.

AAPA indicated (page 2, lines 8-25) that the bulk of the material is removed by lapping using rough abrasive compounds. Therefore, in order to make the color filter substrate thinner than the TFT substrate, the lapping rate for the color filter substrate must be greater than the lapping rate for the TFT substrate. The faster lapping rate would remove more material than the slower lapping rate.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use greater lapping rate for lapping the color filter substrate and to use slower lapping rate for lapping the TFT substrate, in order to make a thinner color filter substrate and a thicker TFT substrate as claimed in claims 2-4 and 10-12, since the thinner substrate would increase the display brightness and thicker substrate would prevent the cracks, especially the TFT substrate has more electrical connections need to be protected and reducing the breakage occurrence.

Claims 5 and 13, AAPA discloses (page 2, lines 8-25) that using 0.7 mm thick array glass substrate and 0.7 mm thick color filter substrate, i.e., the same thickness of 0.7 mm.

Claims 8 and 16, AAPA discloses (page 2, lines 8-25) that polishing is used to make both sides of the cell smooth, and generally, making equal thinning for both the array glass and the color filter glass, therefore, the polishing must be performed at a same polishing rate in order to obtain the equal thinning.

Allowable Subject Matter

6. Claims 6-7 and 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. Claims 17-20 are allowed.
8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither discloses nor teaches a method for fabricating a collimate and post diffuse type liquid crystal cell comprising various steps and a collimate and post diffuse type liquid crystal cell comprising various elements as claimed, more specifically, as the following:

the different thickness for the color filter substrate and the TFT array substrate are 0.4 mm and 0.6 mm respectively [claims 6 and 14];

the thinner color filter substrate and the thicker TFT array substrate so as to provide a depixelization ratio of less than about 1.6 [claims 7 and 15];

the thickness of the color filter substrate is less than the thickness of the TFT array substrate to provide a depixelization ratio of less than about 1.6 [claim 17].

The closest references AAPA, Shin and Ohkuma disclose a collimate and post diffuse type liquid crystal cell wherein the upper and lower substrates having different thickness and using lapping and polishing to make the substrate thinning, but the prior art of records do not disclose the color filter substrate has 0.4 mm thickness and the TFT array substrate has 0.6 mm thickness as claimed in claims 6 and 14; and most references indicate thinning the thickness less than 0.5 mm would be very difficult, because more thin substrate would be very easy to be broken and get cracks. The prior art of records also do not disclose the thinner color filter substrate and the thicker TFT array substrate would provide a depixelization ratio of less than about 1.6 as claimed in claims 7,15 and 17.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703) 308-6213.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi
June 4, 2003


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2300